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# Forestry Canada - Maritimes Region

# TECHNICAL NOTE

## UNDERSTANDING ABIOTIC PROBLEMS IN MANAGED STANDS AND PLANTATIONS

The most difficult identification problems faced by the Forest Insect and Disease Survey (FIDS) are the so-called "abiotic problems". These include such diverse things as winter drying, salt damage, herbicide injury, soil compaction, faulty planting, snow damage, frost, and pollution. Each occurs without a visible causal agent such as an insect or disease. They are common in heavily managed plantations and Christmas tree stands.

When an insect or disease attacks a tree, tracing the problem is often straightforward if a proper sample is taken. With abiotic problems, identification is more difficult since only the **symptoms** expressed by the tree are visible. Red needles, whether caused by winter drying, salt damage or herbicide, are identical to all other red needles! The causes are different but the symptoms are the same.

When a sample of discolored foliage arrives from a Christmas tree stand or managed plantation and shows neither insect damage nor any obvious disease, we require additional information. The notes submitted are carefully examined and the quality and quantity of these notes are absolutely crucial. Ideally, the notes should give a short history of the stand and when the problem was first noticed.

Example: "Trees planted 1983, heavy gall midge last year, sheared, fertilized (give application rate) early summer, discoloration only noted after Brand X herbicide applied this spring by mist blower (give rate). Trees affected along Highway 100 which is salted. Damage concentrated on the sides of the trees next to the road with sheltered sides still green. About 50% of 5 acre stand is affected."

Samples received fall into three broad types, based on the quality of notes which accompany the sample. These notes determine the priority assigned to the sample.

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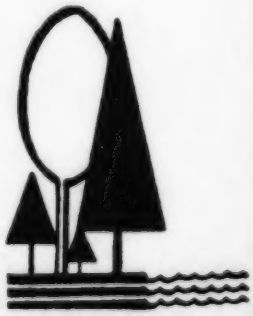

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Type 1. **Thorough notes:** These clearly indicate the type of damage, its pattern and severity both on the tree and within the stand, and the history of any sprays, fertilization, salt exposure, etc. Counts or estimates of affected shoots per tree and an estimate of percent of affected trees in the stand are very useful to show the extent of the problem. Severe problems get highest priority.

Type 2. **Minimal notes:** These may rule out roadside salt, etc. and give us some idea of the size of the problem. Here we may ask some further questions, suggest a resampling or, occasionally, give a probable cause of the condition.

Type 3. **No notes:** It is unclear if the sample represents a single branch on one tree, all the branches on every tree in a large area, or whether it was submitted out of curiosity. The identification will be: **Abiotic injury (general)** and explained very briefly.

**How can the grower make problems easier to identify?**

1. DO NOT SHIP SAMPLES IN PLASTIC BAGS. They usually go moldy en route and require resampling.

2. ROUTINELY leave a few trees or a short row of trees **untreated** as a check or control plot for each treatment when you apply fertilizer, herbicides, and insecticides and make a note of their precise location in your record book.

Example: If you have applied both herbicide and fertilizer to your trees and you get a uniform reddening or yelloving of the trees in the stand, while untreated trees remain green, then you can suspect that the combination of the two treatments may be responsible. It is not proof, but the check plot gives you information you need to start solving the problem with local extension workers.

This simple check plot method can provide essential information and save days of waiting while the sample and the answer go through the mails. It can speed your reply and save many hours of laboratory time. The grower can learn from his experience immediately and avoid costly repetitions in the future.

3. Give DETAILED NOTES on exactly what you see in your trees. Remember, if you don't provide information about spray history, road salt or seaside salt exposure, winter drying, frost, etc. then it may be impossible to separate these look-alikes in the laboratory.

4. If you suspect your trees got too much fertilizer, herbicide or insecticide, tell us in the notes.

**How can the grower minimize abiotic problems?**

1. Protect trees from stress from the beginning! Choose tree species with care. If they don't normally occur on a flood plain, then avoid planting them in wet, heavy soil in dense grass. Transplant with care, avoid injuring or twisting roots, and water thoroughly.

2. Do not exceed recommended dosages when applying fertilizer, herbicides and insecticides. Exceeding recommended dosages or repeated, maximum dose treatments will stress or even kill trees. Money spent for extra chemicals may end up costing you money in a poor crop at harvest.

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